have done their work. In issuing a register of zoological work for 1904 so early as September of the present year, the editor and publisher have indeed beaten our own "Zoological Record"; but it must be remembered that in the present volume is included a considerable amount of literature belonging to earlier years, while it is difficult to believe that the whole of the papers for 1904 can be included.

It might be imagined, for those not conversant with the two works, that the "Zoologischer Jahresbericht" is a serious rival to the "Zoological Record," and that the publication of the one renders that of the other superfluous. As a matter of fact, this is not the case; for, in the first place, it is highly desirable that a record of zoological literature should be published in English, and, in the second, the two publications do not cover the same ground. The "Zoological Record," for instance, is specially devoted to the systematic aspect of the subject, particular pains being taken to include the names of all new species and subspecies. In the Continental work, on the other hand, systematic work is rigorously excluded, and attention concentrated on the bionomical, anatomical, and physiological aspects of the subject. The two records are therefore to a considerable extent supplemental and complementary to one another, more especially as in the one before us a somewhat full *précis* of the main subjects of the more important papers forms an important feature. The practice of including all the papers on Vertebrata under a single heading does not, indeed, appeal to us; but then, it is true, this is in some degree compensated by dividing the summary of their contents into their respective class-positions. So far as we have been able to judge, the quotations of the titles of the papers and the references to their places of publication are singularly free from error, and the volume, like its predecessors, cannot fail to be of the highest value to all workers in morphological and anatomical zoology.

R. L.

Examples in Arithmetic. By C. O. Tuckey. Pp. xii+241+xxxix. (London: George Bell and Sons, 1905.) Price 3*s*.

The Primary Arithmetic. Parts i. and ii. Edited by Dr. Wm. Briggs. Pp. 80 and 94. (London: The University Tutorial Press.) Price 6*d*. each.

THESE books are intended for the use of teachers who instruct their classes orally in the processes and rules of arithmetic, and who only require the assistance of graduated sets of exercises. In the work by Mr. Tuckey the course is fairly complete, embracing the usual commercial arithmetic, with a chapter on the application of proportion to problems in geometry and physics, and a section devoted to numerical computations by the aid of compound interest, logarithmic and trigonometrical tables, in which a little elementary trigonometry is introduced. There are examples on graphs and squared paper work, and the users of the book will have an abundant choice of exercises of modern type.

"The Primary Arithmetic" will be complete in three parts. The first part gives sets of exercises on the four simple rules and on the compound rules for money. The examples increase in difficulty by almost imperceptible stages, beginning with those of the simplest kind, and they are suitable for very young scholars. Part ii. completes the compound rules for weights and measures, including the metric system. Then follow exercises on vulgar fractions and on practice and invoices. In these two parts, as well as in the book by Mr. Tuckey, the answers to the exercises occupy a considerable space at the end of each volume.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

A Magnetic Survey of Japan.

IN NATURE of April 20 (vol. lxxi. p. 578), Prof. A. Schuster has given a comprehensive review of the magnetic survey of Japan with a friendly criticism. The responsibility of its writer may be a sufficient excuse for the following remarks partly in way of reply.

Prof. Schuster directs attention to the small space given to the description of the working of the instruments. This arises from the fact that these instruments were essentially the same as the one used in the previous survey of 1887, and described in vol. ii., pp. 178–193, of the *Journal of the College of Science,* Imperial University, Tokyo, to which the reader is referred for details. A few improvements that have since been made are mentioned in the present report, pp. 7–8.

We are glad to see that the methods adopted for calculating the corrections for heights of stations and the way of disposing with the vertical current met his approval; only Prof. Schuster seems to attribute these currents to uncertainties in the observations, whereas we infer that they are as much, if not more, due to the inadequacy of the empirical formulæ, from the fact that they vanish near the middle of the several countries treated (p. 125).

Perhaps the more important point is with regard to the question of the seat of action. To avoid confusion, it might be well to remark that the word potential is used in different senses by different writers; some use it to denote a function which satisfies the Laplacian equation $\nabla^2 V = 0$, and others to denote the line integral of any irrotationally distributed vector, whether the solenoidal condition be satisfied or not. It is in the latter general sense that the word is used in the report.

Now Gauss's method of separating internal and external sources of action is based upon the assumption that these sources are entirely separated from each other by a free space; in other words, the Laplacian equation holds strictly over a finite portion of the space surrounding the earth surface. This is very plausible when we consider the earth as a magnetised body, as appears *a posteriori*. But when we abandon the restriction of the solenoidal distribution the method is no more applicable, and the observation of force over a spherical surface is not sufficient to settle the seat of action, although it may be expansible in harmonic form if its distribution is continuous, so that the Gaussian expansion must be taken in "Gauss's sense" (end of first paragraph, p. 140 of the report).

The possibility of the distribution of magnetism in the space surrounding the earth surface might appear quite extravagant, and may be included amongst what Gauss calls "boldenlose Phantasien," so long as we are considering the main causes of the terrestrial magnetism; but when we come to discuss the external causes and the horizontal atmospheric current the effects of which amount to only a small fraction of the observed forces, our assumption of the distribution being thoroughly solenoidal would seem subject to doubt, or at least to require observational evidence, so that "strictly speaking, the mode of distribution must remain perfectly arbitrary so long as we adhere solely to the observed elements" of magnetic forces on a spherical surface, when no further assumption than the Newtonian law of action is admitted.

It may not be unnecessary to add here that the search for the seat of action from observations of force over a surface is an inverse problem, and includes any arbitrary distribution of magnetism the resultant effect of which vanishes on that particular surface; we can put any system of magnets or electric circuits outside the surface, provided we envelop that surface with a counteracting shell or shells over which a proper distribution of magnetism is made according to Green's method of finding the density of induced electricity on a conductor, besides any

amount of closed magnetic shells and solenoids. It will thus be seen that even if we take the internal and external sources to be detached, the plain proposition given by Prof. Schuster would appear to require a modifying clause in order to be exact. A. TANAKADATE.

Physical Laboratory, Imperial University, Tokyo, August.

A Polarisation Pattern.

THE following may be of interest to some of your readers. A cylindrical mica chimney of an Auer gas-light is placed vertically on a varnished table. If we look through it at the diffused daylight from a window reflected by the table, faint coloured bands are seen running parallel to the length of the cylinder near both edges. If observed through a Nicol's prism, the band appears very beautiful.

T. TERADA.

Physical Laboratory, Science College, Imperial University, Tokyo, September 8.

A Focusing Screen for Use in Photographing Ultra-violet Spectra.

THE sensitive surface upon which Stokes projected the ultra-violet rays when observing metallic lines and absorption spectra consisted of a plate of plaster of Paris moistened with a paste of uranium phosphate acidified with phosphoric acid (*Journ. Chem. Soc.*, vol. xvii., 1864). Soret used uranium glass and solutions of fluorescent substances such as æsculine in liquid cells. I have found that the most convenient and effective screen for examining spectra with a quartz spectrograph is one such as is used for the X-rays. It may be made as follows:—a photographic plate is first cleared of silver bromide by fixing and washing, and when the film is partly dry, but the gelatin still soft, it is dusted over with a powder of barium platinocyanide crystals, so as to be somewhat thickly coated with the salt. This is fixed in the dark slide of the camera. To focus a spectrum, the slide is tilted to the necessary angle, and a somewhat powerful focusing glass with a flat field is applied to the uncoated surface of the plate, when both the visible and ultra-violet spark spectra may be plainly seen by transmission, the latter by reason of the fluorescence excited. The focusing glass should be first carefully adjusted for any visible object on the other side of a plain glass plate, such as a fine hair fastened upon it, and the position of the eye-piece is then fixed. Suitable focusing glasses are those made by Dallmeyer and by Taylor, Taylor, and Hobson. When the spectrograph has been adjusted by means of the screen, the ultra-violet lines appear quite as sharp as those in the red and yellow, even the details in the group of cadmium lines between wave-lengths 2100 and 2400 are well defined, and a very fair photograph may be obtained; but for the most accurate focusing photography must be resorted to. W. N. HARTLEY.

Royal College of Science, Dublin, October 2.

The Omission of Titles of Addresses on Scientific Subjects.

THE published reports of the British Association make an omission of an equal and opposite character to that about which your correspondent complains. Perhaps these are intended to cancel out. I refer to the publication of titles only, without any text. On receiving the last report (1904, Cambridge) I analysed this matter so far as it relates to Sections A and G, in which I am most interested. In Section A there were 83 communications, 29 of which appear by title only, and of these publication elsewhere is referred to in foot-notes in 4 cases, leaving 25 to the recollection of the audiences who heard them. Section G was better. There were 25 communications, and 13 appeared by title only; but of these 9 may be traced by those who take the trouble to consult the other publications referred to in the foot-notes. A. P. TROTTER.

Westminster, October 3.

THE INTERNATIONAL CONGRESS ON TUBERCULOSIS.

THE International Congress on Tuberculosis, held in Paris on October 2–7, has undoubtedly served as a medium for a most fruitful interchange of views by those interested in the struggle against tuberculosis. The congress was held in the Grand Palais, which from its extent enabled the members to be collected under one roof. The first day was devoted to the formal opening, when the delegates were welcomed by the President of the French Republic, who also after the close of the congress gave a reception at the Palais de l'Elysée. The chief social functions, which were characterised by complete success, comprised a reception at the Hôtel de Ville by the Municipality of Paris, an "at home" by the *Figaro*, at which performances were given by well known artistes, a soirée at the Hôtel Continental given by the president of the congress, Dr. Hérard, another at the Châtelet Theatre by the *Matin*, and a visit to Vaux de Cernay on the invitation of Dr. Henry de Rothschild.

The British Government was represented by Dr. Theodore Williams and Dr. Bulstrode, the National Association for the Prevention of Consumption by Sir William Broadbent and Dr. Perkins, while the foreign Governments and all the leading medical societies and institutions had their special official representatives.

The chief feature of the congress was reserved for the closing *séance*, when Prof. v. Behring announced that he had every reason to hope he had discovered a method of treating tuberculosis which would be as efficacious as the anti-toxin treatment of diphtheria he had first proposed in 1890.

His statement, received with great enthusiasm, was to the effect that, although he had made a great step, the value of his proposed procedure must be tested on animals in other laboratories than his own, and clinically by physicians with an intimate knowledge of the varieties of pulmonary tuberculosis, before it could be said that an actual curative medium had been found.

Prof. Behring, as had been anticipated, gave no exact details as to the method of obtaining or administering his latest therapeutic discovery, but the earlier stages of his work are to be explained in a forthcoming book entitled "Modern Problems of Phthisiogenetic and Phthisiotherapeutic Physiology illuminated by History."

His experiments have led him definitely to abandon the idea of introducing living tubercle bacilli into the human body with a therapeutic object. He has discovered a substance, to which he has given the name T.C., which represents the vital principles of the tubercle bacillus of Koch. To the presence of this substance, which possesses extraordinary fermentative and catalytic properties, is due both the hypersensibility of living organisms to Koch's tuberculin and the protective reaction against tuberculosis. This T.C. impregnates and becomes an integral part of the cells of any organism with which it comes in contact, undergoing a metamorphosis into another substance to which the name T.X. has been given.

This elaboration of T.C. in the organism is a long and perilous process. Prof. v. Behring claims to have succeeded in producing this change *in vitro* by freeing the T.C. from certain substances which impair its therapeutic action. Of these he distinguishes three groups:—(1) a substance (T.V.) only soluble in pure water, and possessing a fermentative and catalytic action. To the presence of this substance are due the toxic effects of Koch's tuberculin. One gram of this in the dry state is more toxic than a litre of the old